

REMARKS

Applicants have filed a Request for Continuing Examination and the Declaration of Dr. Zhendong Liu. Applicants respectfully request reconsideration in view of the Declaration and the following remarks.

Applicant's attorney thanks the Examiners for the interview of January 31, 2006 and agrees with the summary provided.

Since the method claims of Invention II contain the composition limitations of claim 1, Applicants respectfully request reconsideration of the restriction requirement under MPEP § 821.04 upon the allowance of claims 1 to 7.

The action rejects claims 1 to 7 under 35 U.S.C. § 103(a) as being unpatentable over Sun et al. (US Pat. No. 6,709,316) in view of Yano et al. (US Pat. No. 6,375,5645). The Sun et al. reference describes a first-step copper slurry at Col. 6, line 33 to Col. 8, line 39 and a barrier slurry at Col. 8, line 40 to Col. 9, line 65. The action includes ingredients from the first-step copper slurry to reject the claimed barrier slurry of the invention. As stated in the Declaration of Dr. Liu, because first-step copper slurries operate to remove copper at high rates with low barrier removal rates, they teach away from use of a barrier removal slurry. Furthermore, the reference of Sun et al. does not disclose a second step barrier removal slurry that operates at a pH below 4. In fact the prophetic-type Example of Sun et al. operates at a basic pH of 8 to 12. This teaches also away from the acidic barrier slurry of the invention. In addition, Sun et al. fail to disclose a pH less than 4 adjusted with an inorganic acid. The Yano et al. reference teaches the use of a maleic acid monomer (Col. 8, line 1) to form an abrasive particle. Applicants' amended claims cover a water soluble carboxylic acid polymer having at least one repeat unit of the polymer comprising at least two carboxylic acid functionalities. These carboxylic acid polymers can limit dielectric erosion without adversely impacting barrier removal rate. Thus, since Sun et al.

disclose a slurry designed for bulk copper removal, teach away from using a pH less than 4, do not disclose use of an inorganic acid to adjust the pH and Yano et al. do not disclose the claimed water soluble polymer for barrier applications, Applicants respectfully submit that the combined references fail to disclose or suggest claims 1 to 7, as amended.

With respect to claims 2 and 3, Sun et al. disclose a chelating agent, but fail to disclose a water soluble carboxylic acid polymer having at least one repeat unit of the polymer comprising at least two carboxylic acid functionalities. These polymers can limit dielectric erosion without detrimentally impacting tantalum removal rate. Furthermore, the polymer particle disclosure of Yano et al. fails to disclose the claimed water soluble polymers for use in barrier slurry.

With respect to claim 4, Sun et al. at Col. 7, lines 53 to 59 do disclose a pH range of 2.5 to 11. But this range is for the first step slurry that removes copper. The pH range for the second step slurry that removes barrier is 4 to 12—see top of column 9. Applicants have amended the range to no longer overlap the range at a pH of 4.

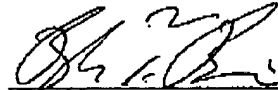
With respect to claim 5, Sun et al. fail to teach the pH range for a barrier slurry, teaches away by having the preferred barrier slurry operate with a basic pH; and the Yano et al. reference teaches a polymeric particle, not a water-soluble carboxylic acid polymer having at least one repeat unit of the polymer comprising at least two carboxylic acid functionalities for improving performance of a barrier slurry.

With respect to claims 6 and 7, please refer to the above arguments to claims 2 and 3.

Applicants respectfully submit that the amended claims are in proper form for allowance and respectfully request reconsideration. If a telephone call would expedite prosecution, please call me at 302 283-2136.

Respectfully submitted,

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Date



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